

Name: _____

Date: _____

Exam: Function Reflections (Solution version 22)

1. Let function f be defined by the polynomial below:

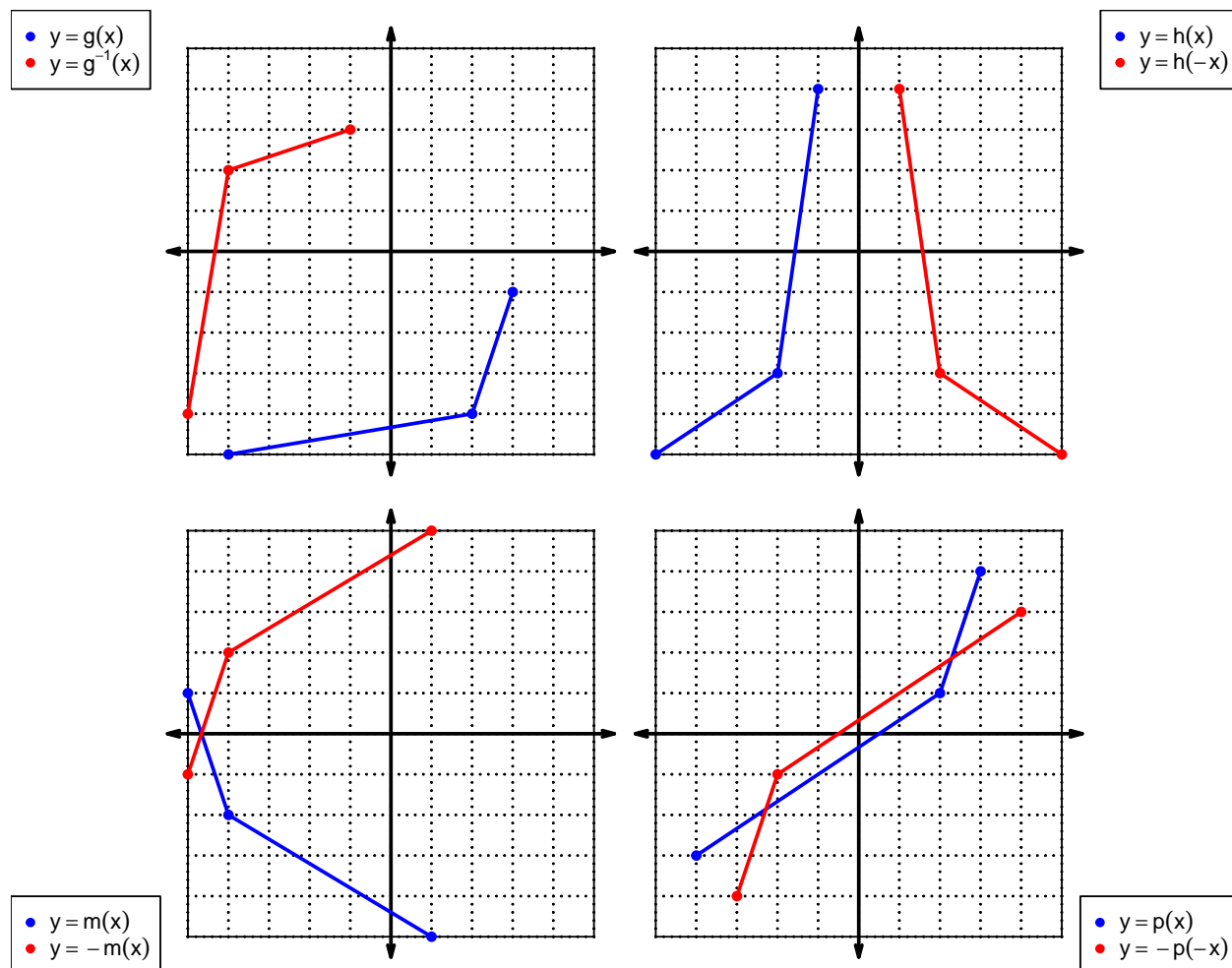
$$f(x) = -2x^5 - 3x^4 - 7x^3 + 5x^2 - 6x + 4$$

Draw lines that match each function reflection with its polynomial:

Reflections**Polynomials**

$-f(x)$	●	●	$-2x^5 + 3x^4 - 7x^3 - 5x^2 - 6x - 4$
$-f(-x)$	●	●	$2x^5 + 3x^4 + 7x^3 - 5x^2 + 6x - 4$
$f(-x)$	●	●	$2x^5 - 3x^4 + 7x^3 + 5x^2 + 6x + 4$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



Exam: Function Reflections (Solution version 22)

For all questions on this page, the functions f , g , and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	8	7	5
2	9	9	4
3	5	2	1
4	1	6	8
5	7	4	6
6	3	8	3
7	6	5	2
8	2	3	9
9	4	1	7

3. Evaluate $f(4)$.

$$f(4) = 1$$

4. Evaluate $g^{-1}(3)$.

$$g^{-1}(3) = 8$$

5. Assuming f is an **odd** function, evaluate $f(-2)$.

If function f is odd, then

$$f(-2) = -9$$

6. Assuming h is an **even** function, evaluate $h(-9)$.

If function h is even, then

$$h(-9) = 7$$

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7. A function, f , is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g , is **odd** if $g(x) = -g(-x)$ for all x in the domain.

Let polynomial p be defined with the following equation:

$$p(x) = x^3 + x$$

- a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = (-x)^3 + (-x)$$

$$p(-x) = -x^3 - x$$

- b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -(-x^3 - x)$$

$$-p(-x) = x^3 + x$$

- c. Is polynomial p even, odd, or neither?

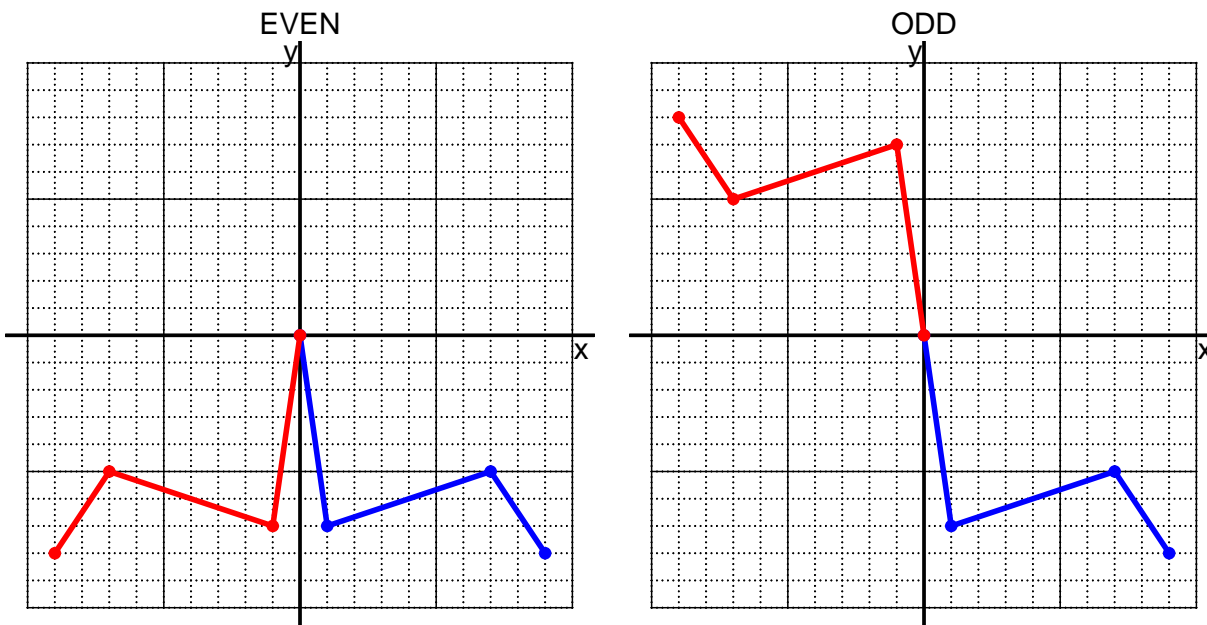
odd

- d. Explain how you know the answer to part c.

We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

Exam: Function Reflections (Solution version 22)

8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{5} + 3$$

- a. Evaluate $f(50)$.

step 1: divide by 5
step 2: add 3

$$\begin{aligned} f(50) &= \frac{(50)}{5} + 3 \\ f(50) &= 13 \end{aligned}$$

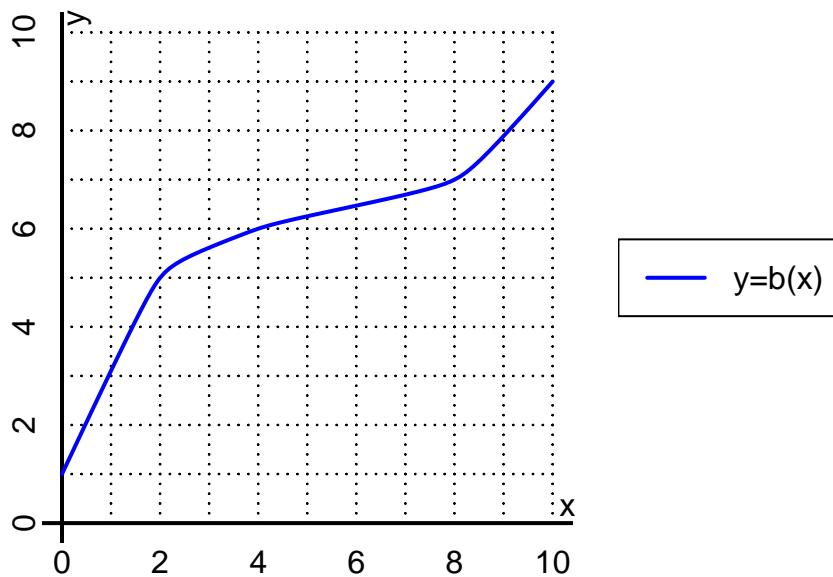
- b. Evaluate $f^{-1}(12)$.

step 1: subtract 3
step 2: multiply by 5

$$\begin{aligned} f^{-1}(x) &= 5(x - 3) \\ f^{-1}(12) &= 5((12) - 3) \\ f^{-1}(12) &= 45 \end{aligned}$$

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10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(4)$.

$$b(4) = 6$$

b. Evaluate $b^{-1}(5)$.

$$b^{-1}(5) = 2$$

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11. Function f is defined by the table below.

a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	3	-3	-3	3
-1	7	-7	7	-7
0	0	0	0	0
1	7	-7	7	-7
2	-3	3	3	-3

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.